Remarks:

Applicant has carefully studied the final Examiner's Action mailed 03/24/2008, having a shortened statutory period for response set to expire 06/24/2008, and all references cited therein. The amendment appearing above and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

Applicant responds to the outstanding Action by centered headings and numbered paragraphs that correspond to the centered headings and paragraphing employed by the Office, to ensure full response on the merits to each finding of the Office.

Claim Rejections – 35 U.S.C. § 112

1. Applicant acknowledges the quotation of the first paragraph of 35 U.S.C. § 112.

2. Claims 1 and 36 stand rejected under 35 U.S.C. 112, first paragraph, because claim 1 as amended in Amendment C recites at least one laser adapted to generate coherent light simultaneously at multiple wavelengths, and the Office asserts that the specification as filed does not indicate that Applicant had possession of said invention. Applicant notes that claim 1 as originally filed includes a limitation that a light source is adapted to generate coherent light at multiple wavelengths simultaneously. This disclosure in the claims has been added to the specification to provide a clear antecedent basis for the claim language and no new matter is thereby inserted into the application in view of the inclusion of said language in original claim 1. The term "simultaneously" is not deleted from claim 1, currently amended, because the specification as filed provides antecedent basis for that term and lasers that generate multiple wavelengths simultaneously are old in the art. Applicant makes no claim to having invented lasers capable of generating multiple wavelengths simultaneously.

Prior to the filing date of this patent application, He-Ne lasers capable of generating three (3) or more wavelengths (yellow, red, green, for example) simultaneously were commercially-available. Moreover, a single CO_2 laser can have two (2) different wavelength selecting diffraction gratings within its gain cavity, and produce two (2) different laser wavelengths simultaneously. This has been known since the 1960s to those of ordinary skill in the art. Two (2) separate CO_2 lasers operating on two (2) different wavelengths can be combined using a beam-splitter to produce a single beam that has two (2) simultaneous wavelengths. The two (2) laser wavelengths could be simultaneous or have temporal separation of fifty nanoseconds (50

ns) up to two hundred microseconds (200 μs) or more. Therefore it is not critical to delete the term "simultaneously" from the claims because one of ordinary skill would understand that simultaneous wavelength generation is well-known. It would be unfair to Applicant to assert that Applicant was not in possession of multiple, simultaneous wavelength-generating lasers at the time this application was filed because such lasers long pre-date the filing date of this application.

Note also in paragraph [0031] of this application where Applicant states "...wavelength or wavelengths emitted by laser generator 12." This expression expresses that multiple wavelengths are generated by laser generator 12 and thus implies simultaneous generation. It would require a strained interpretation of the quoted material to contend that it implies non-simultaneous generation of multiple wavelengths.

In paragraph [0032] of this application, Applicant recites that:

> ...receiving device 22 could be similarly connected in driving relation to a second laser generator and sending device 14 could be similarly fitted with a second sensor so that device 22 could just as easily control device 14.

The provision of a second laser generator also implies generation of multiple wavelengths and one of ordinary skill would expect simultaneous generation of said multiple wavelengths. Non-simultaneous generation would be so unexpected that such non-simultaneous generation would be called out if present. In other words, simultaneous generation is the normal or default understanding.

The same can be implied from the language of paragraph [0035] where Applicant states that:

> any number of laser generators, sending and receiving devices...may be employed...if the signals are encoded or different wavelengths and optically filtered detectors are used.

Again, this language would be understood by those of ordinary skill in the art to refer to different wavelengths generated simultaneously because non-simultaneous generation of different wavelengths would be unexpected in view of the well-known availability of lasers that generate multiple wavelengths simultaneously.

Paragraph [0036] makes further reference to Applicant's possession of a laser capable of generating multiple wavelengths simultaneously:

> Laser generator 12 may be adapted to emit one of a plurality of wavelengths so that a specific signal will control a selective function at receiving device 22. Moreover, sensor 20 may be encoded to a certain wavelength to perform selective functions at various different locations. In this way, a variety of functions may be controlled at a single site because the sensors are enabled to select a certain wavelength to correspond to a specific response.

For all of these reasons, Applicant requests reconsideration and withdrawal of the finding that Applicant was not in possession of a laser capable of simultaneously generating multiple wavelengths at the time the application was filed.

Claim Rejections – 35 USC § 102

3. Applicant acknowledges the quotation of 35 U.S.C. 102(b).

4. Claims 1, 6, 18-27, 30-33 and 36 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Rees. Reconsideration and withdrawal of this ground of rejection is requested. The Office contends that:

> Rees teaches at least one laser (reference numeral 12 in Figure 3) adapted to generate coherent light simultaneously at multiple wavelengths (*i.e.* 16a, 16b, 16c in Figure 3);

However, the reference numerals 16a, 16b, 16c do not represent wavelengths; said "probe volumes" are patches of atmosphere focused upon by telescope 74. If the patch of atmosphere is calm, it will emit no sound. However, a disturbed atmosphere such as the atmosphere inside or under a thundercloud will emit a sound or infrasound that is detected by the Rees instrumentation for the purpose of warning a flight crew and a ground control that such disturbance is occurring within the probe volume. There are multiple probe volumes but all of them are "probed" with a laser beam having a single preselected wavelength. Rees teaches away from lasers that generate multiple wavelengths. It follows that Rees also teaches away from lasers that generate multiple communication channels and it also follows that Rees does not, as the Office contends, teach at least one detector adapted to detect coherent light at multiple wavelengths.

Rees teaches that:

> ...moving objects, such as ships, submarines, or animals in water generate and radiate sound waves which may be detected by a laser sensing system utilizing free space or wave guided light beams to indicate the presence and location of those sound radiating or reflecting objects in the water...
>
> However, despite this public knowledge, no one has suggested or successfully implemented a laser detection system responsive to sound waves produced by adverse or hazardous weather or waked-vortex conditions to provide an advance warning of those conditions to aircraft pilots or airport ground personnel.
>
> The SOCRATES system of this invention is intended to do just that.

Applicant's invention is not anticipated by a laser detection system that is responsive to sound waves. The detection of sound waves plays no part in Applicant's invention.

Rees further teaches:

> An additional object of the invention is to provide novel method (*sic*) with an alternative mode of operation which directs optical beams at full or partial optical reflectors which efficiently return light along optical paths whose speed of light is altered by the arrival of sound waves emanating from adverse weather or wake vortex conditions present in the region of the atmosphere which is spaced a substantial standoff distance from those optical beams.

Clearly, the invention disclosed by Rees is sound wave dependent. The invention claimed by Applicant is not sound wave dependent and is therefore not anticipated by Rees.

The Office further contends that Rees discloses:

> "a plurality of external remote targets and target spatial regions fixed in line-of-sight relation to said laser and in line-of-sight relation to said detector (as seen in Figure 1); said external remote targets and target spatial regions including trees, buildings, clouds, atmospheric aerosols, and like objects that are out-of-doors relative to said laser (as seen in Figure 1);...

However, Rees includes no disclosure whatsoever about targeting trees, buildings, clouds, atmospheric aerosols and the like. Rees targets one hundred twenty eight (128) probe volumes that are neither trees, buildings, clouds, atmospheric aerosols, or the like. A "probe volume" is instead an area of atmosphere a preselected distance in front of an aircraft that is targeted by a laser beam. As Rees explains:

> The number of beams 34 and probe volumes 16 may vary but preferably there are 128 probe volumes arranged in a three dimensional diverging conical configuration in front of aircraft 11, with the probe volumes acting as virtual microphones to detect infrasound waves 20 generated by hazardous weather conditions present in the atmosphere at a stand-off distance B, *e.g.*, 100 km, ahead of aircraft 11. An acoustic array of virtual microphones covering, for example, up to a two steradian spherical cap centered directly ahead of an aircraft for an airborne system or of a ground base system is suggested.

It is therefore not fair to Applicant to equate the "probe volumes" of Rees with the physical objects targeted in Applicant's system. The position of each probe volume changes constantly, receding at the speed of the aircraft so that a fixed distance is maintained between the probe volume and the aircraft as the aircraft flies towards the probe volume. The Rees system teaches away from using target objects in the external environment.

Applicant employs a plurality of targets where each target is used for a different communications channel. Rees neither teaches nor suggests that each target be used for a different communications channel because none of the Rees targets ("probe volumes") are used for any communications channel.

More particularly, the Office contends that Rees discloses:

> said communication device adapted to aim said modulated light from said at least one laser at said plurality of external remote targets and target spatial regions to separate spatially different communication optical signals from one another (reference numeral 16 in Figure 1);

This contention lacks support because Rees includes no communication optical signals nor does Rees include a communication device that separates the non-existent communication optical signals from one another.

Regarding claims 6, 18, and 19, Applicant respectfully traverses the Office's finding that Rees discloses:

> A barrier means (reference numeral 70 in Figure 3) adapted to be positioned between said first and second data communication devices, said barrier means preventing line-of-sight communication between said first and second data communication devices;

There is no barrier means 70 disclosed by Rees. Item 70 is a mirror disposed at a forty five degree angle that allows light from a laser to pass straight through and that reflects light from beam expander 72 so that it follows a path of travel that is bent ninety degrees with respect to the light that travels straight through said mirror. In the words of Rees:

> From splitter 38 beam 34*a* passes entirely through a backside beam deflector 70, beam expander 72, and focused telescope 74 into probe volume 16*a* located at a desired opto-acoustic remote sensing range A from telescope 74.

The Office also argues that Rees has a receiver telescope that focuses light on an optical detector:

> whereby said receiver telescope (reference numeral 74 in Figure 3) causes reflected light at said multiple wavelengths to focus on said optical detector;

However, Figure 3 reveals that focused telescope 74 is not focused on an optical detector; it is focused on one of the probe volumes (16*a*) and said probe volume is not a physical object but an area of space in front of an aircraft that recedes from the aircraft at the speed of the aircraft. In fairness to Applicant, the Office should not equate a volume of airspace with an optical detector.

Regarding claim 20, The Office argues that focused telescope 74 is both the transmitting and receiving telescope as recited in said claim 20. That is not fair to Applicant since it is very obvious that Applicant claims two (2) physically spaced apart telescopes, one dedicated to transmitting and one dedicated to receiving. The lone telescope 74 of Rees does not suggest a second telescope as claimed. The Office further argues that Rees discloses:

> at least one obstacle (that) prevents line-of-sight communication between said data transmitting device and said data receiving device (*i.e.*, the objects in the environment that reflect the laser beam).

However, Rees discloses no objects in the environment that reflect the laser beam. The mirrors 70 and 86 inside the Rees device cannot be equated, in fairness to Applicant, with objects in the environment. Applicant's device functions if a physical barrier is positioned between the transmitting and receiving telescopes. Rees' device cannot function if a physical barrier is placed between lone telescope 74 and a probe volume 16.

Regarding claim 21, Applicant acknowledges that electrical signal conditioners are well-known, although they were not heretofore positioned downstream of a data transmitter and upstream of a laser light source in the novel data communication system invented and claimed by Applicant. Claim 21 depends from independent claim 20, currently amended, and is therefore allowable as a matter of law upon allowance of said claim 20.

Regarding claim 22, Applicant acknowledges that electrical signal conditioners are well-known, although they were not heretofore positioned downstream of an optical detector and upstream of a data receiver in the novel data communication system invented and claimed by Applicant. Claim 22 depends from independent claim 20, currently amended, and is therefore allowable as a matter of law upon allowance of said claim 20.

Regarding claim 23, Applicant acknowledges that optical bandpass filters are well-known. Claim 23 depends from independent claim 20, currently amended, and is therefore allowable as a matter of law upon allowance of said claim 20. Rees discloses a single telescope, and therefore cannot be fairly interpreted as teaching an optical bandpass filter between a receiver telescope and said optical detector.

Regarding claims 24 and 26, the Office argues that Rees teaches "multiple optical wavelengths (*i.e.* 16a-16c in Figure 3) for communication of different communication signals simultaneously when the same external remote target is used as a common target for multiple communication devices." However, items 16a-16c are probe volumes, not optical wavelengths. Moreover, the probe volumes do not reflect optical signals of any wavelength; they are preselected areas of atmosphere that produce no sound when the atmosphere is calm. When the atmosphere is agitated with downdrafts, microbursts, and the like, such probe volumes emit sound or infrasound if said probe volumes are within the agitated area and said sound is detected by the Rees apparatus. Rees teaches away from the art of optical communication devices that have barriers preventing line-of-sight communication between such devices.

Regarding claims 25 and 27, the Office argues that Rees teaches "multiple optical wavelengths (*i.e.* 16a-16c in Figure 3) for communication of different communication signals simultaneously when the same external remote target is used as a common target for LIDAR communication devices (*i.e.* a laser)." Again, items 16a-16c are probe volumes, not optical wavelengths. The probe volumes do not reflect optical signals of any wavelength; they are preselected areas of atmosphere that produce no sound when the atmosphere is calm. When the

atmosphere is agitated with downdrafts, microbursts, and the like, such probe volumes emit sound or infrasound if said probe volumes are within the agitated area and said sound is detected by the Rees apparatus. Rees teaches away from the art of optical communication devices that have barriers preventing line-of-sight communication between such devices.

Regarding claims 30, 31, 32, and 33, The Office incorrectly characterizes the "detectors" of Rees as "multiple telescope receivers." That which the Office identifies as "detector" 87 is a charge coupled device (CCD) and although it may be fair to characterize a CCD as a detector, it is not fair to also characterize it as a receiver telescope. Such a characterization would be a blatant unfairness to Applicant.

Regarding claim 36, said claim depends from claim 1 and is allowable as a matter of law upon allowance of said claim 1, currently amended. Moreover, Rees does not teach a plurality of external remote targets in non line-of-sight relation to a detector. Any barrier between telescope 74 of Rees and any probe volume 16 renders the Rees system inoperable. Applicant employs two (2) telescopes so that a barrier that prevents line-of-sight communication between said telescopes does not prevent a transmitter telescope from using an object in the external environment as a reflector so that a transmitted beam may reflect from such object and arrive at said receiver telescope.

No prior art reference of record teaches or suggests a laser or LIDAR for generating and transmitting an external beam that is reflected from atmospheric particles, broadly known as aerosols, or against trees, buildings, or other natural or man-made objects remote from the coherent light source so that a communications signal is detected simultaneously by multiple remote telescope receivers positioned at different locations that are not in line-of-site relation to one another. In fairness to Applicant, it must be acknowledged that the sound-reliant, no intervening barrier system of Rees teaches away from the invention as claimed.

In Applicant's system, as claimed, the use of two different targets such as a tree and a building separates the two different communications channels from one another, and provides security from cross-talk between the two channels because different spatial targets are used, *i.e.*, the tree and the building occupy different spaces. These significant aspects of the invention are recited in the independent claims as currently amended. The Rees sound-detecting system does not suggest communication channels at all, much less separate communication channels that suppress cross-talk.

Applicant is the first, anywhere in the world, to provide a communication device for transmitting signals to a receiver, where the transmitter and receiver are not in line-of-sight relation to one another, that includes at least one laser adapted to simultaneously generate coherent light at multiple wavelengths, at least one detector adapted to detect the coherent light at multiple wavelengths, and a plurality of external remote targets and target spatial regions fixed in line-of-sight relation to the laser and in line-of-sight relation to the detector where the external remote targets and target spatial regions are trees, buildings, clouds, atmospheric aerosols, and like objects that are out-of-doors relative to the laser. Applicant's first-in-the-world system further includes a modulating device connected in modulating relation to the laser and the modulating device is adapted to modulate each of the multiple wavelengths so that multiple messages are transmitted. The novel communication device is adapted to aim the modulated light from the at least one laser at the plurality of external remote targets and target spatial regions to separate spatially different communication optical signals from one another. The at least one detector is adapted to demodulate light scattered by the target and includes an optical bandpass filter adapted to pass preselected wavelengths of light and reject wavelengths of light outside of the preselected wavelengths. Multiple messages are therefore transmitted along multiple wavelengths and the multiple messages are individually detected by the at least one detector, all as recited in claim 1 as currently amended. No fair characterization of Rees teaches or suggests such invention.

Response to Arguments

5. Applicant acknowledges the new grounds of rejection.

Conclusion

6. A Notice of Allowance is solicited. Applicant includes herewith a Request For Continued Examination and the appropriate fee. If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (813) 925-8505 is requested. Applicant thanks the Office for its continuing careful examination of this important patent application.

Very respectfully,

SMITH & HOPEN

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Jessica Powell